No. 6.

REPORT on Sanitary Matters in Black River District and the Extra Urban Area of Plaines Wilhems.

By

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Memoranda already submitted—(*Continued*)

211/R/83 of 20.8.21. Mosquito-proofing of Police Stations.
222/R/92 of 26.8.21. Trench at Black Biver, Military Post.
226/R/95 of 1.9.21. Schistosomiasis at Bambous.

Villages.

Petite Rivière.

Villages.—Petite Rivière.—This small place of 1,233 inhabitants shares with Bambous the distinction of having a night-soil and scavenging service. It also shares the former with Bambous, there being 1 cart and 3 men for the 2 villages. The work is in the hands of a contractor, the place of disposal for tub contents being, in the case of Petite Rivière, Richelieu, where there is a closed engrais of a fair type and in the case of Bambous, Medine Estate where there is an open engrais in the shape of a midden heap.

For the scavenging service 1 cart and 2 men are employed. There is not much to say about this village which is fortunate in possessing a supply of Mare aux Vacoas Water. Examination of the dispensary records and enquiries at the school showed that influenza and malaria were the commonest maladies. The source of the latter is a small water-course, at present dry, which arises below Chebel and which in the rainy season presents every facility for mosquito-breeding. It should receive early attention.

Bambous.

Bambous.—This is the most important village in Black River District. It possesses 1,715 inhabitants and is the centre of an irrigation area where vegetables, especially potatoes, are largely grown. I found that not only is malaria common but that at least 15 children in the school suffered from bloody urine and that the condition was common among the villagers. Strange to say there was no record of the condition amongst the entries at the dispensary and, sad to say, no treatment is given the sufferers though the disease, as is now well know, can easily be cured by injections either of antimony or emetine.

A focus of schistosomiasis.

An enquiry into the incidence of the disease in this locality is urgently required and preventive and remedial measures should be at once adopted. Doubtless the disease is derived partly from working in cercariæ-infected water in the irrigated area and partly from drinking water. The supply of the latter from an open canal is bad and yet good water could readily be obtained from the Eaux Bonnes Springs, (*vide infra.*)

Bad water supply.

The night-soil service has been mentioned. The engrais at Medine must be condemned like all these dangerous manure heaps. There is a small public latrine in Bambous presenting the usual defects.

A butcher's shop, clean but not fly-proof and a small private slaughter house of a fairly good, if simple, type and furnished with an absorption pit attracted attention. The solitary bake-house was found to be clean and to possess a moderately good floor. Yeast is employed and bran as "chapelure."

Mosquito-proofing for police station.

The Police Station requires a special note as, in my opinion, the living quarters should be rendered mosquito-proof. There are 2 corporals and 6 men. It would be an easy matter to make the barracks, inhabited by one of the corporals and the men, mosquito-proof, for they are a type of building which lends itself to such an alteration. Information has been furnished on the subject (My 211/R/83 of 20.8.21.) At the barracks one of the latrines was found to be only 4 feet from the kitchen and its door fronted the kitchen window. It can easily be removed and placed elsewhere in a convenient place. This should be done without delay. (It has now been accomplished).

Enquiry at the Civil Status Office showed that the chief causes of death at Bambous were malaria, influenza and pneumonia

Palma.

Palma.—This village, situated in one of the higher parts of of the district, contains about 400 people who live in scattered houses. The most important point regarding it, is the prevalence of typhoid fever which is almost certainly connected with a faulty water supply. The water is drawn from a well which is in a bad condition and the wooden cover of which has decayed. The supply is undoubtedly liable to pollution and should be discontinued. Fortunately the nearest Mare-aux-Vacoas pipe line is only $1\frac{1}{2}$ miles distant and I have recommended that a supply pipe be laid from it (My 207/R/79 of 18.8.21). The well should then be filled up or the well head hermetically sealed by cement concrete. (The new water supply has been approved).

Prevalence of typhoid fever.

Flic-en-Flacq.

Flic-en-Flacq.—This is a small village near the coast where there is a cemetery in sandy soil and a large swamp (*vide infra*). The only point which need here be noted regarding it is that good water could be supplied to it from a spring above the marsh and on the Anna Estate.

Casela.

Casela, a tiny hamlet, is situated a considerable distance from any pure supply of water, At a lower level there are the Casela springs. I have suggested that it should be well to move the village to another site where it could be supplied from the spring by gravitation. It appears this would present no difficulty.

Tamarin.—This is a fishing village at the mouth of the river of the same name. Apart from the ever present question of night-soil disposal which here, as in the other non-proclaimed villages of the district, could be solved by the introduction of the Sanitary Concrete Privy Vault, the most important problem is the water supply. At present water is drawn from the river and fortunately can be obtained from the centre of the stream, owing to the presence of a causeway with arches. The river water is impure but the risk of danger is lessened if the water be taken from the rapidly flowing central current. Tamarin.

At the same time there are campements in the immediate neighbourhood of Tamarin Village and it would certainly be well if a joint pure supply could be obtained. Owing to the difficulty of levels it is impossible to bring in a piped supply of good water save from a great distance. I would therefore recommend that one of two schemes be adopted. Question of water supply.

(1) That a well be sunk close to the river margin, to form what is known as a "galerie filtrante" and if the water obtained therein be found satisfactory that it should be adequately protected and a pump affixed.

(2) That a pipe line be laid from the river a short distance above the causeway *i.e.* at a place where, for purposes of distribution, pumping will not be required and that the water be chlorinated at the intake. A small chlorinating plant would not be costly and a man could easily be trained to look after it.

Riviere Noire.—There are only few houses here but there is a police station. The police quarters are suitable for mosquito-proofing and, I am of opinion, should be protected as there is a great deal of malaria in this locality. The incidence might be lessened if steps were taken to deal with a large trench which runs behind the campements. It is some 660 or 700 feet in length and 75 feet across, collects water after rain and permits the breeding out of *A. costalis*. It would be a simple matter to fill it up from the neighbouring foreshore and the cost should not exceed Rs. 1,000. The proposal has been mooted but nothing so far has been done. It seems to me reasonable to put the scheme forward for execution. The water supply is derived from a canal coming from the Grande Rivière Noire. It is polluted but I think there should be no great difficulty in having it improved. (See under "Special Water Supplies p. 5). Rivière Noire.

Case Noyale.—There is nothing special to note here. Malaria is common. A scrutiny of the books in the Civil Status Office revealed the fact that nine deaths occurred from the disease during July of this year. Case Noyale.

Chamarel, a very scattered hamlet of about 600 people, lies high up amongst the hills above Case Noyale. It has the reputation of being a healthy place save for occasional small outbreaks of typhoid fever. There does not appear to be much malaria. In one of the streams examined the larvæ of *A. mauritianus* were found but I did not come across *A. costalis*. Chamarel.

The conditions, however, would appear very favourable for the breeding out of the latter.

There is no night-soil service, cess pits being used. There are no wells, water being obtained from rivers and streams which are, to some extent, polluted. According to the records in the Civil Status Office, the more important recent causes of death are influenza, pneumonia and fever.

Sugar Estates.—The *Ste. Marie* camp lines are of the usual type. The water supply is derived from a canal. In the latrines two compartments were found without receptacles. Generally speaking the place, though small, looked comfortless and rather untidy. Sugar Estates St. Marie.

Medine.—Here the camp lines are placed on barren, sterile soil and are free from vegetation, a great improvement from a sanitary standpoint. The hospital has well ventilated wards and a good floor. The latrine buildings were found in good condition. The water supply is obtained from springs. In the summer the prevailing diseases are dysentery and malaria. This is not surprising considering that the engrais is represented by a privy midden and that amongst the weeds bordering the neighbouring River des Galets, *A. costalis* larvæ are, even at this time of year, fairly numerous. To save time the Manager of Medine agreed to have the river cleaned even though the Anna Estate is responsible. Medine.

It is hoped that a "fuming pit" latrine will be installed here and the Manager agreed to have the River des Galets put in order. The effluent from the factory is used for irrigation and is said not be productive of nuisance.

Albion.—This estate was visited with the view to finding out the necessity or otherwise of a proposed water supply (*vide infra*). The estate itself presents no special features. Albion.

Grand Rivière Noire.

Grande Rivière Noire.—Here one only considered the question of water supply from the canal traversing the estate (*vide infra*).

Schools.

Schools.—*Government School, Petite Rivière.*—Pupils on roll 113. Average attendance 70. Illness said to be the chief cause of absence, influenza and malaria being common. The school building is fair, well ventilated and has a thatched roof. For the teaching of hygiene Pouzet and Crétin's books are used. I found the latrine in a fair condition, there being a good floor.

Government School, Bambous.—Pupils on roll 150. Average attendance 100. Absences due to illness principally malaria. The last entry in the spleen index book shows that out of 94 pupils examined, 59 showed large spleens and 24 of these marked splenomegaly. At the same time I must point out that an enlarged *soft* spleen is not necessarily a sign of malarial infection. There are other causes of splenomegaly besides malaria, notably rickets and certain worm infections, for example, clonorchiasis. The big hard spleen is no doubt very characteristic of malaria in Mauritius but the whole question of splenomegaly requires further investigation and certainly the method of examination requires modification. Quinine is given regularly during the summer but apparently without expert medical advice.

The water supply is exceedingly bad, being taken from an open cement pit in the yard which collects the grossly polluted waters of the small Eaux Bonnes Canal.

At this school I elicited the fact that at least 15 of the children suffer from hæmaturia. On enquiry it appeared undoubtedly to be due to schistosomiasis (bilharziasis).

I obtained a sample of urine from one of the cases and had the diagnosis confirmed, the terminal-spined eggs of *S. haematobium* being present. I have already referred to the matter and a memorandum has been submitted (My 226/R/95 of 1.9.21. Crétin's book on hygiene is used in this school. The latrines are of a good type and were clean at the time of my visit but I found that the occasion had been regarded as important and a special effort had been made. Why it cannot always be made has not yet been explained.

Church of England Aided School, Palma.—Pupils on roll 141. Average attendance 125. Chief causes of absence stated to be influenza, dysentery, malaria and typhoid fever. There have been six cases of typhoid fever since the beginning of this year and in the past typhoid fever has killed several of the pupils. The cause is almost certainly to be found in the defective water supply already mentioned (p. 2) and the remedy in a pipe line from the Mare-aux-Vacoas installation at Quatre Bornes. The latrines are represented by cesspits and function fairly well. The school building is a fairly good one and *mirabile dictu* was designed for school purposes.

Government School, Clarens.—The school is housed in an old sugar estate hospital. The building though large is not weather-proof. Pupils on roll 52. Average attendance 22. Chief causes of absence stated to be measles, influenza and malaria. The schoolmaster himself suffers severely from malaria and the spleen index is high. Quinine is given in a very irregular fashion and, according to the schoolmaster, produces haemoglobinuria in some of the pupils. On enquiry, however, I am almost certain that the bloody urine is really due to schistosomiasis. A microscopical examination should be made to settle the matter.

The water supply is bad and yet within easy reach there is a pipe conveying pure water from the Casela spring. All that is required is a $\frac{3}{4}$ inch pipe of 100 yards length and a tap. I strongly recommend that this work be put in hand forthwith.

The latrines require attention. There are two cesspits and two pail latrines. The cesspits are preferable for they have box seats over them, but in one case the flooring is defective and the pit and its contents are exposed. The Sanitary Concrete Privy Vault system should certainly be installed here.

R. C. Aided School, Case Noyale.—A chapel serves as the school building. Pupils on roll 40. Average attendance 30. Causes of absence stated to be malaria and influenza. In November 1920 out of 36 children examined, 18 showed splenomegaly and 9 big spleens. The latrines are of the cesspit variety and fairly good.

Government School, Chamarel.—The building is quite good, commodious and weather-proof. Pupils on roll 60. Average attendance 41. The chief causes of absence are stated to be malaria, (this is doubtful) measles and dysentery. Apparently the spleen index has been nil since December 1919. The cesspit latrines are good save for the fact that openings, presumably for ventilation, have been made in them at ground level. These serve no useful function and afford access to flies. They should be closed pending the introduction of the proper privy vault system.

Railway Stations.—These do not merit a special note. At Medine Station pit latrines are in force. Railway Stations.

Special Water Supplies.—These are a matter of great importance in Black River and have received special attention. Efforts have been made in the past to secure pure water for certain villages, but, so far, without avail. Now, however, it is to be hoped that the matter will receive serious consideration especially as good supplies are readily obtainable. Special Water Supplies.

Eaux Bonnes Springs.—A scheme has been put forward to furnish water from these fine perennial springs to Bambous, Medine Village, Sugar Estate and Railway Station, La Mecque, Anna Estate and Camp. I visited the spot where the springs crop out in a wood near the base of St. Pierre Mountain. There are about 25 of them in all but it would not be necessary to impound the whole of them as an ample yield could be obtained from a comparatively small number. One of them, which need not be included, is close to cultivated lands near the southern end of the La Ferme embankment. The others are all far from any possible source of pollution and once they are properly protected should furnish an excellent supply. The water has been analysed and found good but the actual discharge has not yet been calculated. The intention is to supply about 4,000 people and the approximate cost is Rs. 30,000. The scheme appears to me to be a very excellent and a very necessary one which must be seriously considered in connection with the allottment of monies for sanitary purposes from the Mauritius Improvement Fund. Eaux Bonnes Springs.

Casela Springs.—Here again we have springs of pure water welling out in an uninhabited locality. The water can be utilised for the supply of Casela and Clarens and possibly also for Flic-en-Flacq though, as stated, the last named might be supplied at less cost from a spring on the Anna Estate. To get water from the springs to the village of Casela in its present situation would require pumping and this would be an unjustifiable expense. It would be cheaper and easier to move the village to a site where the spring water could reach it by gravitation. The Casela scheme, so far as water works are concerned, would probably cost about Rs. 5,000 and has much to commend it. Casela Springs.

Grande Rivière Noire Estate Canal.—Here unfortunately the water is taken from the canal downstream of a few houses opposite which it is contaminated in various ways. Provided the levels permit it should be easy to transfer the intake to a spot above these houses i.e. between them and the dam in the Grand River gorge. Care could then be taken that no building is permitted above the source of water supply. The latter would be in an uncultivated country and the present unsatisfactory state of things would cease. Failing this alteration it will be necessary to place a chlorinating plant on the pipe line just below the present intake. It is absurd to provide expensive piping and other works for the conveyance of impure water for drinking purposes. Canal, Grande Rivière Noire.

Water Supply to Albion Estate.—This is also a question meriting consideration. There is a standpipe furnishing a supply of Mare-aux-Vacoas water at the cross-roads whence a path leads to the light-house at Pointe aux Caves. Is it justifiable to extend the pipe line from this spot to Albion Estate at an approximate cost of Rs. 14,000 ? One can only say that, if the money is available, it is certainly justifiable but all these water schemes must be considered together and also in relation to the other and pressing calls on the Mauritius Improvement Fund which, large though it be, is by no means a widow's cruse. The most important matters have the prior claim and hence, until the question of sanitary works can be considered as a whole, it would be futile to make any definite pronouncement. Supply to Albion Estate.

Engrais.—That at *Richelieu* has been mentioned. It could, I think, easily be converted into a smoke engrais. Elsewhere, I trust, all the privy middens will be completely abolished. Engrais.

Special Institutions and Works.—All the *Aloe Fibre Factories* cause more or less of a nuisance, both from the smell of the waste products and from the fouling of streams or ditches by effluent. At the same time these factories are situated so far away from any centres of population that these nuisances, which can in any case scarcely be called dangerous nuisances, may be ignored. Aloe fibre factories.

The same is not true of *La Ferme Reservoir* for, unless very carefully looked after, this place may easily become a hot-bed of mosquito life at the period of the year when its waters are low. At that time, instead of being an irrigation reservoir, it may readily become an anophoeline reservoir for La Ferme Reservoir.

the shallow pools along its margin are ideal breeding places for *A. costalis* so long as fish cannot gain access to them. I have no doubt the mosquito can be kept in check but, at the dangerous period, La Ferme should have a "moustiquier" to itself. At my request the Director, Public Works Department has had a large number of borrow-pits at the southern end of the dam filled up and the subsoil drained. The question is now being considered as to the necessity or otherwise of dealing in a similar manner with borrow-pits close to the northern part of the dam The whole area round about La Ferme will require watching.

Experimental Irrigation Centre.

This is the case also with the new *Government Experimental Irrigation Centre* for any irrigation work in a district like Black River may easily become a source of nuisance and danger. At the same time, as will be explained, this Centre is likely to prove a useful adjunct in the fight against malaria for it should be able to furnish data of great value (*Vide infra*).

Swamps.

Marshes and Anti-Malarial Works.—To the malariologist the Black River District is a place of much interest. It is believed that this was the part of the Island into which *A. costalis* was first introduced and where malaria first showed itself in epidemic form. *Anopheles costalis* is an African species and certainly it would find itself very much at home in the southern portion of the district. No wonder then that it speedily established itself and wrought havoc and destruction.

Anti-Malarial. Works.

Major anti-malarial works have not been carried out to any great extent in Black River District but where they have been put in hand they have been well executed and well unkept. This is evident from a study of the canalised portions of the Rivière du Rempart, the Belle Isle River, the River Dragon, the Rivulet Cresson and more especially the lower part of the Grande Rivière Noire. It is most instructive to compare the present state of the last named with its appearance as shown in a photograph in Major Fowler's report.

There are still, however, many streams requiring attention like the River des Galets already mentioned and the River du Bougan at Yemen. It may be said that where these course through uninhabited or sparsely populated areas there is no call to deal with them. Doubtless it is of less importance to clean, train and canalise water courses in such localities but it must not be forgotten that, if untreated, they remain reservoirs for the supply of mosquitoes which quickly spread from them to other places. Hence, so far as money and labour are available, it is a sound policy to deal with all possible breeding places, more especially in a comparatively small Island like Mauritius. Too ambitious a programme is of course impossible but it is necessary to aim at a high ideal even if it is not wholly attainable.

Irrigation ponds.

Irrigation ponds are quite a feature of the district. Those that are deep are not dangerous so long as their margins are kept clean. In dealing with shallow water stretches, slowly running streams and sluggish canals it may be possible to utilise an aquatic plant which I took to be a species of Azolla and which I found carpeting the Rivulet Cabot and beginning to spread over the Rivulet Gros Cailloux. *Azolla filiculoides* is an aquatic plant which has been largely used as a preventive to mosquito-breeding. It forms a dense green growth almost like a scum on the water surface and effectually prevents the female mosquito ovipositing. Mr. D'Emmerez de Charmoy has kindly informed me that the plant in the Black River District is not an Azolla but *Lemna minor*. It is interesting to find a water weed resembling Azolla in its habits in Mauritius and its possible virtues should not be forgotten. It certainly merits a trial though I am told the Indians gather it as a food for ducks which is unfortunate.

Use of Azolla.

The question of irrigation.

One of the chief problems in the Black River District, so far as malaria is concerned, is irrigation and it is a problem largely because there is careless irrigation and a waste of water.

After looking carefully into the matter I cannot help thinking that a great deal might be done by exercising proper control. If sluices were fixed at all places where the waters of rivers, &c., are diverted for irrigation purposes and if it became the rule that only sufficient water to serve the crops was permitted to be taken there can be little doubt that considerable benefit would result. What is really required is a small irrigation service and hence one hails as a step in the right direction the establishment of the Government Experimental Station. It is surprising to see how much water is wasted at present and alarming to note the pools and puddles in which aquatic vegetation soon appears, to be speedily followed by the broods of *A. costalis*. The matter is a very serious one and should form the subject of a careful enquiry, more particularly in the summer. It is difficult for me at present to envisage the conditions actually obtaining during the hot and most unhealthy season of the year. I

Formation of irrigation service.

think it may be useful if I give here a series of irrigation rules which I drew up for the Sudan where unchecked irrigation was a veritable curse and where the same malarial vector was in evidence.

Irrigation Rules.

1. Irrigation channels should be constructed on a higher level than the surrounding land, so that when the flow of water in them ceases they may drain dry.

2. They should be constructed of such material and in such manner as to prevent leakage.

3. Their banks and beds should be kept in good repair, and the beds even, to prevent leakage.

4. "Dead ends" of irrigation channels should be reduced to the smallest size compatible with efficiency, so that water will not stagnate in them.

5. Vegetation should be periodically cleared out of the channels.

6. Sluices should be constructed so that there is no leakage to form stagnant puddles.

7. Where possible, fish should be introduced, and kept in the main channels to destroy the larvæ.

8. Lands where water is apt to stand should have proper surface drainage.

9. If an engine or pump should happen to break down, particular care should be taken to deal with stagnant pools, and petroleum should be used where necessary.

10. Cases of malarial fever and any prevalence of mosquitoes should at once be notified by the manager of the concession.

Marshes.

The *Marshes* of the Black River District are both numerous and extensive. In the northern portion there are the coastal swamps of Pointe aux Sables, Albion, Flic-en-Flacq and Wolmar. Of these I have seen Albion and Flic-en-Flacq and I understand they are all very similar.

Albion.

In the case of Albion there is much open water and if only the encircling weeds were kept down there would be fewer anopheline nurseries. Petroleum firesprays would be useful here as used in Panama.

Flic-en-Flacq. Bon Asile Magenta. Walhala.

I am told that Flic-en-Flacq, at the margin of which I took many anopheline larvæ, could be easily drained to the sea The large inland Bon Asile swamp which is already drained in some measure, could, along with the neighbouring Magenta Marsh, be given an outlet to the River du Rempart. The Walhala marshes could similarly be drained into the Tamarin River.

It would certainly, I think, pay to get rid of all the last-named for the land, after its reclamation, could be put under sugar-cane. Again it must be remembered that all these swampy areas form huge mosquito reservoirs from which other places must become infected. Much more active and intensive anti-mosquito work is required in the Black River District during the comparatively cool winter months. Great numbers of larvæ could then be destroyed. It is ludicrous to think that there are only two moustiquiers for the whole area and that the Sanitary Inspector and Guards carefully refrain from taking any share in the operations.

Need for mosquito-brigade.

There must be a large, well trained and energetic mosquito brigade to wage incessant war upon *Anopheles costalis* in all its stages. I know from experience what remarkably good results can be obtained by a thorough and systematic campaign. If this is carried out, the swamps drained where possible, and irrigation carefully controlled, I believe a great deal can be accomplished, and if funds can be spared for extending the major works on streams and rivers so much the better. It is true that the Black River District presents a difficult problem to the malariologist but I should not call it hopeless. The Americans had a much heavier task in the Panama Canal area and were successful. It is the case that neither their resources nor their personnel will be forthcoming here but a great deal can be accomplished by steady and persistent effort along sound lines and the results will, I believe, justify the time, money and energy expended.

EXTRA-URBAN AREA, PLAINES WILHEMS DISTRICT.

Extra-urban area Plaines Wilhems

This area comprises all the portions of the district outside the townships of Beau Bassin, Rose Hill, Quatre Bornes, Phœnix, Vacoas and Curepipe.

It may be divided into a southern portion, a south western part and a north eastern strip.

Mare-aux-Vacoas Reservoir.

The southern portion is almost uninhabited and, from, a sanitary standpoint is only of interest in that it contains the large Mare-aux-Vacoas Reservoir which is so well known that it need not be described in a short report of this kind. I would only say that it is a most valuable hygienic asset and that the reservoir and the filter beds at La Marie constitute an interesting and excellent example of water-works engineering. As I have said elsewhere I am of opinion that the water of the reservoir should not be used for irrigation purposes but should be employed solely to serve the sanitary needs of the community. There should also be a greater bacteriological control as mentioned in my report on Port Louis and special care should be taken when repairs to the pipe lines are being carried out.

La Marie Filter Works.

Caldwell Road.

The only part of the south western portion here meriting attention is that in the vicinity of Caldwell Road. On either side of this Road, in the region traversed by the Rivers du Rempart and Papaye, swamps have been drained and the land reclaimed. Both these rivers find their way into the Black River District and, on this account, and because the Tamarin River has its source in this part of Plaines Wilhems, there is a close connection between these two adjacent districts. It would therefore seem desirable that both should be under a single sanitary authority. As will be found I recommend that the Black River District and the extra-urban part of Plaines Wilhems be placed under the same Medical Officer of Health. There are several non-proclaimed hamlets of little sanitary importance in the neighbourhood of Caldwell Road.

School at Glen Park.

The *Glen Park R. C. Aided School* was inspected. It is housed in a chapel and there is an annex in the form of a shed. Pupils on roll 227. Average attendance 198. There is said to be a good deal of illness which is classed under the heading " fever " for the most part. This would not seem to be malaria as the spleen index is small but here, as elsewhere, it is very difficult to get exact information and, until there is a properly organised medical inspection of schools as advocated in my 224/R/43 of 29th August 1921, we will remain largely in the dark as to what complaints the school children in Mauritius are really liable. The microscope must be brought into action, and school pathology placed on a sound basis. At Glen Park the books of Crétin and Pouzet are used in the teaching of hygiene, Mare-aux-Vacoas water is available and the latrines, though not of a very bad type, were found in a filthy condition.

Montagne Payet

A little further to the North attention was directed to the small village of Montagne Payet at the base of Candos Hill. This is now a healthy place though formerly it was plagued with malaria. Extensive drainage work has wrought a marked change.

Victoria Hospital, Candos.

The new and yet uncompleted *Victoria Hospital* has been visited on several occasions and, at the request of H. E. the Governor, I carried out a special inspection with the Director, Public Works Department and the Acting Director, Medical and Health Department. Several problems were discussed and the conclusions reached will be noted in a report on medical matters which will be submitted in due course.

Camp Fouquereaux.

The north-eastern section of the extra-urban area is of very considerable importance for it contains the large and scattered village known as Camp Fouquereaux. There are two separate parts of this village and the locality is populous, containing roughly 5,000 people. Yet Camp Fouquereaux is a non-proclaimed village and the night-soil service is limited to government institutions and such inhabitants as care to contract for it. The contents go to an Engrais at Trianon.

Anti-mosquito work.

There is said to be much dysentery in this part of Plaines Wilhems. There is still some malaria but it has decreased as the result of drainage operations. Several marshes have been dried up and streams, such as the *River Ducray*, trained or canalised. Further work is required in connection with the *Terre Rouge River* and the *Ruisseau Couacaud*. The village is rather smothered in sugar-cane and a certain amount of clearance should be effected. There is neither a bake-house nor a market. The water supply is bad, being derived from the Terre Rouge River and its tributaries. The upper part of the Plaines Wilhems river is in this locality and its water is doubtless also utilised. Certain Mahomedan merchants paid for the laying of water pipes from Highlands Estate to the village with a view to obtaining Mare-aux-Vacoas water. So far it has not been obtained owing to deficient pressure. I am told that now a new service reservoir has been completed close to Phœnix Station it will be possible for the water to reach Camp Fouquereaux, a consummation much to be desired.

Water supply.

Government School.

Government School.—This was closed at the time of my visit so I had to be content with inspecting the yard and sanitary conveniencies. The former

was untidy and rather dirty, the latter were very unsatisfactory. As I have often said these pail closets in schools are nearly always dangerous and disgusting places and where the system cannot be made safe and cleanly, it should be abolished altogether and the improved type of pit latrine substituted for it.

Highlands Estate.

HIGHLANDS ESTATE.—This large and wealthy estate, which is not far from the above village, is, from a sanitary point of view, one of the worst of the sugar estates visited. So bad were the conditions that I considered it necessary to submit a special memorandum regarding them (My 220/R/90 of 24.8.21) and to call for speedy action. The camp lines contain good stone buildings with tiled roofs, but the houses are unfit for human habitation, being devoid of windows and being to all intents and purposes back-to-back dwellings. The rooms are nearly pitch dark when the doors are shut, ventilation is defective and their state must favour every variety of vermin including rats and fleas. They should be pulled down and new lines built. Pending complete reconstruction ridge ventilation should be introduced. The camp precincts were fairly clean but a little overgrown with vegetation. Mare-aux-Vacoas water is available.

Estate hospital.

The hospital is of the usual type but is not well ventilated and is badly kept. I found the bedding filthy and ragged. The small female ward containing four beds was quite unsuitable for hospital purposes. There were only plank beds. It is true these are permitted by the regulations (erroneously I think, considering their liability to harbour bed bugs) but most estates provide beds of a more comfortable type for their sick employees.

At Highlands the rule appears to be—economy first.—This is no exaggeration. The latrines are in a ruinous condition with roofs full of holes. The isolation ward, though in itself fair, has been built as close to the main hospital as possible, presumably to save expense. The yard was full of weeds. No water supply is laid on and water has to be brought from a tap, about $\frac{1}{4}$ mile away. Influenza, fever and ulcers were the prevailing diseases in this apology for an hospital. The dispensary is a miserable place which is not weather-proof and the dispenser is paid the princely salary of Rs. 75. per mensem. He looked to me ill and half-starved.

The engrais of the Estate is open, there being merely a roof on iron stanchions save at one end where there are grass walls and small masonry tanks built in accordance with the new regulations. A petition was submitted regarding the latter and they were declared a dead letter for the time being. Hence flies have free access to the engrais contents. Fortunately the place is a good distance from any human habitation.

It is needless to comment further on an estate like Highlands but, to say the least, it is bad policy to house and to treat employees in a manner for which there is absolutely no justification and for which there can be no excuse.

SUMMARY OF MORE IMPORTANT RECOMMENDATIONS.

Summary of Recommendations.

1. A Medical Officer of Health to be placed in charge of Black River District and the Extra-Urban Area of Plaines Wilhems. He can reside in the latter district,

2. There should be a Sanitary Inspector for each of the regions dealt with in this report. The Inspector for Black River should reside at Bambous, the other inspector at Camp Fouquereaux.

3. A Mosquito Brigade should be formed for the Black River District, consisting of one Foreman and 6 other men trained to detect the water stages of mosquitoes and to undertake minor anti-malarial work. (See Note on Sanitary Administration and Practice, My 239/R/106 of 5.9.21). This Brigade would work constantly in the District and be reinforced during the winter months.

4. An enquiry should be instituted into the incidence of schistosomiasis at Bambous and Casela and measures taken for its prevention and for the cure of cases.

5. The well at Palma to be closed and Mare-aux-Vacoas water introduced from Quatre Bornes.

6. The water supply schemes of Eaux Bonnes and Casela to be sanctioned and their cost defrayed out of the Mauritius Improvement Fund.

7. A good water supply to be installed at Tamarin Village, one of the two methods described being adopted.

8. The water supply to Rivière Noire to be improved in the manner indicated.

9. The question of extending to Albion Estate the existing pipe line carrying Mare-aux-Vacoas water to be considered.

10. Police quarters at Bambous and Rivière Noire to be rendered mosquito-proof.

11. A special moustiquier to be appointed for La Ferme during certain seasons of the year.

12. Trench to be filled behind the campements at Rivière Noire.

13. Irrigation to be controlled in the Black River District and irrigation rules adopted.

14. Several streams and rivers to be cleared and trained.

15. The coastal swamps of Pointe aux Sables, Albion, Flic-en-Flacq and Wolmar and the inland marshes of Bon Asile, Magenta and Walhala to be surveyed with a view to ascertaining how they can best be treated from an anti-malarial point of view.

16. Mare-aux-Vacoas water to be supplied to Camp Fouquereaux.

17. The condition of the camp lines, hospital and engrais of Highlands Estate to be remedied.

I have the honour to be,
Sir,
Your obedient servant,

ANDREW BALFOUR.